

What is claimed is:

1. An electrically conductive shaped article comprising a polymer resin and conductive fillers, wherein the polymer resin is a polymer blend comprising (1) from about 10 to 100 wt%, preferably from about 50 to about 100 wt% of a grafted polyolefin or a blend of grafted polyolefins and (2) from 0 to about 90 wt%, preferably from about 0 to about 50 wt% of at least one other thermoplastic polymer having a melting point below 280 °C.
2. The electrically conductive shaped article of claim 1, wherein the grafted polyolefin is a grafted polypropylene.
3. The electrically conductive shaped article of claim 2, wherein the grafted polypropylene is maleic anhydride grafted polypropylene.
4. The electrically conductive shaped article of claim 1, wherein the grafted polyolefin contains from about 0.05 wt% to about 10 wt%, preferably from about 0.05 to about 5 wt% of ethylenically unsaturated carboxylic acid or its derivatives grafted onto the grafted polyolefin.
5. The electrically conductive shaped article of any one of claims 1 to 4, comprising from about 10 wt% to about 50 wt%, preferably from about 15 wt% to about 25 wt%, of the polymer resin and from about 50 wt% to about 90 wt%, preferably from about 75 wt% to about 85 wt%, of the conductive fillers.
6. The electrically conductive shaped article of claim 2, wherein the grafted polypropylene comprises a grafted polypropylene homopolymer, grafted propylene copolymers or mixtures thereof.
7. The electrically conductive shaped article of any one of claims 1-6, wherein the conductive fillers are selected from carbon fillers, graphite fillers, metallic fillers, inherent conductive polymers and mixtures thereof, and the conductive

fillers are in the shape of spherical or irregular particles, fibers, powders, flakes or a mixture thereof.

8. A conductive flow field separator plate for use in a polymer electrolyte membrane fuel cell comprising a polymer resin and conductive fillers, wherein the polymer resin is a polymer blend comprising (1) from about 10 to 100 wt%, preferably from about 50 to about 100 wt% of a grafted polyolefin or a blend of grafted polyolefins and (2) from 0 to about 90 wt%, preferably from about 0 to about 50 wt% of at least one other thermoplastic polymer having a melting point below 280 °C.
9. The conductive flow field separator plate of claim 8, wherein the grafted polyolefin contains from about 0.05 wt% to about 10 wt%, preferably from about 0.05 to about 5 wt% of ethylenically unsaturated carboxylic acid or its derivatives grafted onto the grafted polyolefin.
10. The conductive flow field separator plate of claim 8 or 9, wherein the grafted polyolefin is maleic anhydride grafted polypropylene.
11. The conductive flow field separator plate of any one of claims 8-10, comprising from about 10 wt% to about 50 wt%, preferably from about 15 wt% to about 25 wt%, of the polymer resin and from about 50 wt% to about 90 wt%, preferably from about 75 wt% to about 85 wt%, of the conductive fillers.
12. The conductive flow field separator plate of claim 10, wherein the maleic anhydride grafted polypropylene has a resin base of polypropylene homopolymer, a copolymer of propylene with other olefinic monomers or a mixture thereof.
13. The conductive flow field separator plate of any one of claims 8-12, wherein the conductive fillers are selected from carbon fillers, graphite fillers, metallic

fillers, inherent conductive polymers and mixtures thereof, and the conductive fillers are in the shape of spherical or irregular particles, fibers, powders, flakes or a mixture thereof.

14. The conductive flow field separator plate of claim 10, having a volume resistivity of not more than about 0.1 ohm.cm and a flexural strength of not less than about 3000 Psi.
15. A method of making a conductive flow field separator plate comprising the steps of:
 - (a) mixing a polymer resin with conductive fillers to form a conductive blend, wherein the polymer resin is a polymer blend comprising (1) from about 10 to 100 wt%, preferably from about 50 to about 100 wt% of a grafted polyolefin or a blend of grafted polyolefins and (2) from 0 to about 90 wt%, preferably from about 0 to about 50 wt% of at least one other thermoplastic polymer having a melting point below 280 °C; and
 - (b) molding the conductive blend to form the conductive flow field separator plate.
16. The method of claim 15, wherein the grafted polyolefin comprises from about 0.05 wt% to about 10 wt%, preferably from about 0.05 to about 5 wt% of ethylenically unsaturated carboxylic acid or its derivatives grafted onto the grafted polyolefin.
17. The method of claim 15 or 16, wherein the grafted polyolefin is maleic anhydride grafted polypropylene.
18. The method of any one of claims 15-17, comprising from about 10 wt% to about 50 wt%, preferably from about 15 wt% to about 25 wt%, of the polymer

resin and from about 50 wt% to about 90 wt%, preferably from about 75 wt% to about 85 wt%, of the conductive fillers.

19. The method of claim 17, wherein the grafted polyolefin has a resin base of a polypropylene homopolymer, a copolymer of propylene with other olefinic monomers or a mixture thereof.
20. The method of any one of claims 15-19, wherein the conductive fillers are selected from carbon fillers, graphite fillers, metallic fillers, inherent conductive polymers and mixtures thereof, and the conductive fillers are in the shape of spherical or irregular particles, fibers, powders, flakes or a mixture thereof.
21. The method of any one of claims 15-20, wherein the separator plate has a volume resistivity of not more than about 0.1 ohm.cm and a flexural strength of not less than about 3000 Psi.
22. A process for making a conductive flow field separator plate for use in polymer electrolyte membrane fuel cells comprising the steps of:
 - (a) feeding a mixture of a polymer resin and conductive fillers into an injection molding machine, wherein the polymer resin is a polymer blend comprising (1) from about 10 to 100 wt%, preferably from about 50 to about 100 wt% of a grafted polyolefin or a blend of grafted polyolefins and (2) from 0 to about 90 wt%, preferably from about 0 to about 50 wt% of at least one other thermoplastic polymer having a melting point below 280 °C,
 - (b) plasticising the mixture at a temperature above the melting point of the polymer resin to form a melt,
 - (c) injecting the melt into a mold,

- (d) allowing the melt to cure in the mold to form the conductive flow field separator plate, and
 - (e) removing the conductive flow field separator plate from the mold.
23. The process of claim 22, wherein in step (c), the mold is closed.
24. The process of claim 22, wherein in step (c), the mold is partially opened, and comprising the further step of closing the mold completely and then compressing the melt.
25. The process of any one of claims 22-24, wherein the grafted polyolefin comprises from about 0.05 wt% to about 10 wt%, preferably from about 0.05 to about 5 wt% of ethylenically unsaturated carboxylic acid or its derivatives grafted onto the polyolefin.
26. The process of any one of claims 22-25, wherein the grafted polyolefin is maleic anhydride grafted polypropylene.
27. The process of any one of claims 22-26, wherein the blend comprises from about 10 wt% to about 50 wt%, preferably from about 15 wt% to about 25 wt%, of the polymer resin and from about 50 wt% to about 90 wt%, preferably from about 75 wt% to about 85 wt%, of the conductive fillers.
28. The process of claim 26, wherein the maleic anhydride grafted polypropylene has a resin base of a polypropylene homopolymer, a copolymer of propylene with other olefinic monomers or a mixture thereof.
29. The process of any one of claims 22-28, wherein the conductive fillers are selected from carbon fillers, graphite fillers, metallic fillers, inherent conductive polymers and mixtures thereof, and the conductive fillers are in the shape of spherical or irregular particles, fibers, powders, flakes or a mixture thereof.

30. The process of any one of claims 22-29, wherein the separator plate has a volume resistivity of not more than about 0.1 ohm.cm and a flexural strength of not less than about 3000 Psi.